

Degradação do corante Acid Blue 29 pelo processo Fotoelectro-Fenton Solar em uma Planta Piloto Laboratorial

Degradation of dye Acid Blue 29 by Solar Photoelectro-Fenton process in a Laboratory Pilot Plant

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Abstract: Daily, industries produce high volumes of wastewater containing pollutants difficult to remove by traditional treatment of wastewater. Textile dye, Acid Blue 29 (AB29), is known as persistent organic pollutants, due to its resistance at both, photo and biodegradation.

Solar photoelectro-Fenton (SPEF) process is an electrochemical advanced oxidation process (EAOPs) that permit high removal of different organic pollutants. By SPEF, hydroxyl radicals are the responsible of the degradation and mineralization of organics. SPEF method presents advantages in efficiency and cost with respect the electro-Fenton process (EF), due to the effect of solar radiation.

In this work, the removal of AB29 by SPEF was studied. 10 L of solutions containing 100 mg L⁻¹ of Total Organic Carbon (TOC) of AB29 with 0.5 mM de Fe²⁺ and 0.05 M Na₂SO₄ at pH 3.0, applying a current density of 25 and 50 mA cm⁻². The electrolysis were performed in a pilot plant constructed in our laboratory (Fig. 1). The pilot plant contained an electrochemical filter press cell with a DSA anode and an Air-difussion cathode coupled to solar photoreactor.

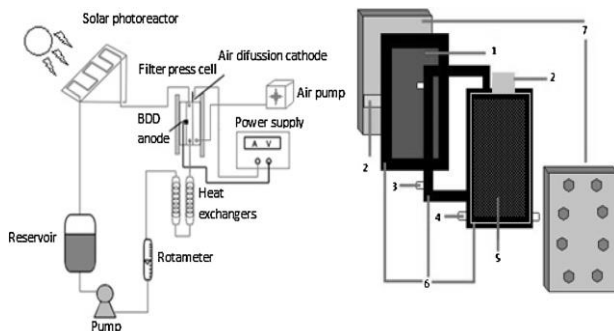


Fig. 1. Laboratory pilot plant and electrochemical filter press cell used in the process.

A complete mineralization of dye AB29 was obtained by SPEF process at the end of electrolysis, together a the complete decolorization of the solutions at short times. Intermediates

of reaction such as carboxylic acids and inorganic ions were found during the oxidation process. Solar radiation favors the mineralization of the dye decreasing both, the cost and efficiency, in comparison with other electrochemical methods.

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Reference:

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